

Read example 8.9 page 218

Solve the following exercises

15. A block of mass $m = 2.00$ kg is attached to a spring of force constant $k = 500$ N/m as shown in Figure P8.15. The block is pulled to a position $x_i = 5.00$ cm to the right of equilibrium and released from rest. Find the speed the block has as it passes through equilibrium if (a) the horizontal surface is frictionless and (b) the coefficient of friction between block and surface is $\mu_k = 0.350$.

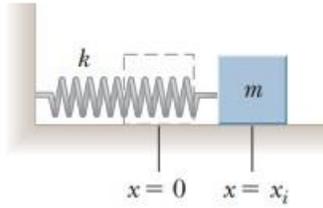


Figure P8.15

23. A 5.00-kg block is set into motion up an inclined plane with an initial speed of $v_i = 8.00$ m/s (Fig. P8.23). The block comes to rest after traveling $d = 3.00$ m along the plane, which is inclined at an angle of $\theta = 30.0^\circ$ to the horizontal. For this motion, determine (a) the change in the block's kinetic energy, (b) the change in the potential energy of the block–Earth system, and (c) the friction force exerted on the block (assumed to be constant). (d) What is the coefficient of kinetic friction?

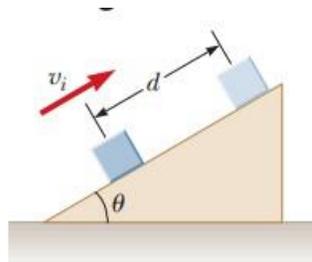


Figure P8.23

Solution:

15)

a) $v_f = 0.79 \text{ m/s}$

b) $v_f = 0.531 \text{ m/s}$

23)

a) $\Delta k = -160 \text{ J}$

b) $\Delta U = 73.5 \text{ J}$

c) $f_k = 28.8 \text{ N}$

d) $\mu_k = 0.679$